

Claims

1. An apparatus for identifying and labeling spinal structures in a medical diagnostic image of a patient, comprising:
  - a memory configured to receive the medical diagnostic images;
  - a program stored in the memory and operatively configured to detect a plurality of voxels in the image as candidate spinal structures, to apply at least one spinal structure constraint to identify a subset of the plurality of voxels as a series of spinal structures, and to label the series of spinal structures as a selected specified one of a cervical, thoracic, lumbar vertebral structures; and
  - a processor in communication with the memory to perform the program.
2. The apparatus of claim 1, wherein the program is further operatively configured to identify a selected seed vertebral structure and to identify adjacent vertebral structures by locating a longest chain of voxels and analyzing spacing and quantity of voxels in the longest chain.
3. The apparatus of claim 1, wherein the program is further configured to define putative spine structures by defining a search region, applying intensity thresholds, applying additional disc constraints, and identifying the longest chains.
4. The apparatus of claim 3, wherein the program is further configured to combine data and then search along a reconstructed path neighborhood for local maxima.
5. The apparatus of claim 4, wherein the program is further configured to make a determination whether twenty three spinal discs have been selected, and if not to search for an additional discs based on estimated interdisc distance for each level.

6. The apparatus of claim 4, wherein the program is further configured to search for an additional disc by extending a line from the longest chain and analyze for an additional disc.
7. The apparatus of claim 4, wherein the program is further configured to search for additional discs by extending the search line, drawing additional parallel lines to the extended line and analyze for additional discs.
8. The apparatus of claim 4, wherein the program is further configured to search for an additional disc by analyzing an elongate space between adjacent discs and analyze for an additional disc by adjusting a search constraint.
9. The apparatus of claim 4, wherein the program is further configured to apply optimized Gaussian filters to the search part..
10. The apparatus of claim 4, wherein the program is further configured to search for auto-prescribed additional imaging planes and sequences.
11. The apparatus of claim 1, wherein the program is further configured to analyze a selected spinal structure to diagnose osteoporosis.
12. A method for performing a medical diagnostic imaging scan of a patient, comprising:
  - placing a longitudinally unique opaque spinal coil on external to a spine of a patient;
  - performing a scout scan;
  - identifying and labeling on diagnostic scans each vertebral body of the spin;
  - autoprescribing a portion proximate to a vertebral body for a detailed scan;

identifying a unique longitudinal position of the spinal coil proximate to a surgical site contained within the autoprescribed portion; and  
inserting a therapeutic instrument localized by the spinal coil to the surgical site.